

## § 572.17

(2) Adjust the test probe so that its longitudinal centerline is at the forehead at the point of orthogonal intersection of the head midsagittal plane and the transverse plane which is perpendicular to the "Z" axis of the head (longitudinal centerline of the skull anchor) and is located  $0.6 \pm 0.1$  inches above the centers of the head center of gravity reference pins and coincides within 2 degrees with the line made by the intersection of horizontal and midsagittal planes passing through this point.

(3) Adjust the dummy so that the surface area on the forehead immediately adjacent to the projected longitudinal centerline of the test probe is vertical.

(4) Impact the head with the test probe so that at the moment of impact the probe's longitudinal centerline falls within 2 degrees of a horizontal line in the dummy's midsagittal plane.

(5) Guide the probe during impact so that it moves with no significant lateral, vertical, or rotational movement.

(6) Allow a time period of at least 20 minutes between successive tests of the head.

[44 FR 76530, Dec. 27, 1979; 45 FR 43353, June 26, 1980, as amended at 45 FR 82267, Dec. 15, 1980; 55 FR 30468, July 26, 1990]

### § 572.17 Neck.

(a)(1) The neck for use with the head assembly described in § 572.16(a)(1) consists of the assembly designated as SA 103C 020 on drawing No. SA 103C 001, conforms to each item specified on drawing No. SA 103C 002(B), sheet 9.

(2) The neck for use with the head assembly described in § 572.16(a)(2) consists of the assembly designated as SA 103C 020 on drawing No. SA 103C 001, and conforms to each item specified on drawing No. SA 103C 002, sheet 9.

(b) When the head-neck assembly is tested in accordance with paragraph (c) of this section, the head shall rotate in reference to the pendulum's longitudinal centerline a total of 84 degrees  $\pm 8$  degrees about its center of gravity, rotating to the extent specified in the following table at each indicated point in time, measured from impact, with the chordal displacement measured at its center of gravity. The chordal displacement at time T is defined as the straight line distance between (1) the

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position relative to the pendulum arm of the head center of gravity at time zero, and (2) the position relative to the pendulum arm of the head center of gravity at time T as illustrated by figure 3. The peak resultant acceleration recorded at the location of the accelerometers mounted in the headform in accordance with § 572.21(b) shall not exceed 30g. The pendulum shall not reverse direction until the head's center of gravity returns to the original zero time position relative to the pendulum arm.

Rotation (degrees)	Time (ms) $\pm(2 \times .08T)$	Chordal displacement (inches $\pm 0.8$ )
0 .....	0	0
30 .....	21	2.2
60 .....	36	4.3
Maximum .....	62	5.8
60 .....	91	4.3
30 .....	108	2.2
0 .....	123	0

(c) *Test procedure.* (1) Mount the head and neck on a rigid pendulum as specified in Figure 4, so that the head's midsagittal plane is vertical and coincides with the plane of motion of the pendulum's longitudinal centerline. Mount the neck directly to the pendulum as shown in Figure 15.

(2) Release the pendulum and allow it to fall freely from a height such that the velocity at impact is  $17.00 \pm 1.0$  feet per second (fps), measured at the center of the accelerometer specified in figure 4.

(3) Decelerate the pendulum to a stop with an acceleration-time pulse described as follows:

(i) Establish 5g and 20g levels on the a-t curve.

(ii) Establish  $t_1$  at the point where the a-t curve first crosses the 5g level,  $t_2$  at the point where the rising a-t curve first crosses the 20g level,  $t_3$  at the point where the decaying a-t curve last crosses the 20g level, and  $t_4$  at the point where the decaying a-t curve first crosses the 5g level.

(iii)  $t_2 - t_1$ , shall be not more than 4 milliseconds.

(iv)  $t_3 - t_2$ , shall be not less than 18 and not more than 21 milliseconds.

(v)  $t_4 - t_3$ , shall be not more than 5 milliseconds.

(vi) The average deceleration between  $t_2$  and  $t_3$  shall be not less than 20g and not more than 34g.

(4) Allow the neck to flex without contact of the head or neck with any object other than the pendulum arm.

(5) Allow a time period of at least 1 hour between successive tests of the head and neck.

[44 FR 76530, Dec. 27, 1979; 45 FR 43353, June 26, 1980, as amended at 55 FR 30468, July 26, 1990]

#### § 572.18 Thorax.

(a) The thorax consists of the part of the torso shown in assembly drawing SA 103C 001 by number SA 103C 030 and conforms to each of the applicable drawings listed under this number on drawing SA 103C 002, sheets 10 and 11.

(b) When impacted by a test probe conforming to § 572.21(a) at 13 fps in accordance with paragraph (c) of this section, the peak resultant accelerations at the location of the accelerometers mounted in the chest cavity in accordance with § 572.21(c) shall be not less than 50g and not more than 70g. The acceleration-time curve for the test shall be unimodal at or above the 30g level and shall lie at or above the 30g level for an interval not less than 2.5 milliseconds and not more than 4.0 milliseconds. The lateral acceleration shall not exceed 5g.

(c) *Test procedure.* (1) With the dummy seated without back support on a surface as specified in § 572.21(h) and oriented as specified in § 572.21(h), adjust the dummy arms and legs until they are extended horizontally forward parallel to the midsagittal plane. The joints of the limbs are adjusted at any setting between 1g and 2g, which just supports the limbs' weight when the limbs are extended horizontally forward.

(2) Establish the impact point at the chest midsagittal plane so that it is 1.5 inches below the longitudinal centerline of the bolt that attaches the top of the ribcage sternum to the thoracic spine box.

(3) Adjust the dummy so that the tangent plane at the surface on the thorax immediately adjacent to the designated impact point is vertical and parallel to the face of the test probe.

(4) Place the longitudinal centerline of the test probe to coincide with the designated impact point and align the test probe so that at impact its longitudinal centerline coincides within 2 degrees with the line formed by intersection of the horizontal and midsagittal planes passing through the designated impact point.

(5) Impact the thorax with the test probe so that at the moment of impact the probe's longitudinal centerline falls within 2 degrees of a horizontal line in the dummy midsagittal plane.

(6) Guide the probe during impact so that it moves with no significant lateral, vertical or rotational movement.

(7) Allow a time period of at least 20 minutes between successive tests of the chest.

#### § 572.19 Lumbar spine, abdomen and pelvis.

(a) The lumbar spine, abdomen, and pelvis consist of the part of the torso assembly shown by number SA 103C 030 on drawing SA 103C 001 and conform to each of the applicable drawings listed under this number on drawing SA 103C 002, sheets 10 and 11.

(b) When subjected to continuously applied force in accordance with paragraph (c) of this section, the lumbar spine assembly shall flex by an amount that permits the rigid thoracic spine to rotate from its initial position in accordance with Figure 18 of this subpart by 40 degrees at a force level of not less than 34 pounds and not more than 47 pounds, and straighten upon removal of the force to within 5 degrees of its initial position.

(c) *Test procedure.* (1) The dummy with lower legs removed is positioned in an upright seated position on a seat as indicated in Figure 18, ensuring that all dummy component surfaces are clean, dry and untreated unless otherwise specified.

(2) Attach the pelvis to the seating surface by a bolt C/328, modified as shown in Figure 18, and the upper legs at the knee axial rotation joints by the attachments shown in Figure 18. Tighten the mountings so that the pelvis-lumbar joining surface is horizontal and adjust the femur ball-flange screws at each hip socket joint to 50 inch pounds torque. Remove the head and